UNITED STATES PATENT AND TRADEMARK OFFICE

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10/728,466	12/05/2003	Jayaram K. Beladakere	4998P024	9415

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EXAMINER
JUNTIMA, NITTAYA

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	10/728,466	BELADAKERE ET AL..
	Examiner	Art Unit	
	Nittaya Juntima	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>12 October 2007</u>.

2a) ☒ This action is **FINAL**.   2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>1-19</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) <u>1-19</u> is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on <u>05 December 2003</u> is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All   b) ☐ Some * c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1.   This action is in response to the amendment filed on 10/12/2007.

2.   Claims 1-19 are pending.

3.   Claims 1-3 and 5-19 are currently rejected under 35 U.S.C. 102(e).

4.   Claim 4 is currently rejected under 35 U.S.C. 103(a).

Claim Objections

5.   Claims 10 and 16 are objected to because of the following informalities:

- in claim 10, line 9, "to switching" should be changed to "that switches" since the switching is carried out the fabric, not the switch management circuit (see paragraph 0018 of the specification).

- in claim 16, lines 1-2, "switch management circuit" should be changed to "packet-switched switching fabric" since the switch management circuit (see the central TDM synchronization 380 and central table coordination 370 in Fig. 3 and is only responsible for synchronization and TDM allocation (see paragraphs 0021-0022 of the specification), therefore, it *cannot* determine whether an egress device has available bandwidth and transmit PDU traffic to any device as claimed. The switching fabric (the central scheduler of the switch 301 in Fig. 3), however, is the one that is actually responsible for the scheduling and arbitrating of the PDU traffic. See paragraphs 0025, 0046, and 0048 of the specification.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

6.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed
> in the United States before the invention by the applicant for patent or (2) a patent granted on an application for
> patent by another filed in the United States before the invention by the applicant for patent, except that an
> international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this
> subsection of an application filed in the United States only if the international application designated the United
> States and was published under Article 21(2) of such treaty in the English language.

7.   Claims 1-3 and 5-19 are rejected under 35 U.S.C. 102(e) as being anticipated by an art of

record, Personick (US 2002/0191588 A1).

Regarding claim 1, Personick teaches a method for operating a switching node (input

transitional switch 26 in Fig. 1), comprising:

Maintaining a packet-switched fabric (a core switch 28) that switches TDM traffic

(circuit switched packets) and packet-based traffic (packet switched packets) (core switch 28 for

switching packet switched data comprising circuit switched packets and packet switched packets

is maintained in network 10 as shown in Fig. 1, Abstract, paragraphs 0025, 0033-0036, 0038-

0039).

Overlaying the packet-switching of the fabric with a repeating synchronized frame (a

periodically repeating signal cycle of period T having N time slots, Fig. 2), the frame to allocate

timeslots for switching the TDM traffic and the packet-based traffic (a quantity of time slots per

cycle is reserved for circuit switched packets for each link 24 and empty time slot(s) is used for

transmitting packet switched packets. See paragraphs 0025, 0030, 0042, 0046-0048, and 0051

and steps 112, 114 and 122 of Fig. 5.

Switching both the TDM traffic and the packet-based traffic in accordance with the

repeating synchronized frame (steps 116 and 124 of Fig. 5 and paragraphs 0049 and 0051).

Regarding claim 2, Personick also teaches maintaining a table (a database) having a row

of entries, each entry corresponding to a timeslot of the frame (because (i) a database containing

the quantity of the time slots reserved for each of the circuit switched circuits on each TDM links

24 is maintained, paragraph 0030, and (ii) each TDM link 24 contains a periodically repeating

signal cycle of T period having N time slots, paragraph 0025 and 0031, therefore a row of entries

corresponding to a time slot of a cycle must be included in the database); populating the entries

in the table according to a contention-free allocation (time slot reservation/allocation for circuit

switched packets must be contention free in order to meet the required throughput specified in a

circuit request, paragraphs 0030-0031, 0048); and transmitting a cell on a timeslot in accordance

with the populated table (each circuit switched packet is transmitted in an assigned time slot and

each packet switched packet is transmitted in a first occurring empty time slot, paragraphs 0048

and 0051).

Regarding claim 3, Personick also teaches maintaining a timeslot-reservation table for

TDM traffic (a database containing the quantity of the time slots reserved for each of the circuit

switched circuits on each TDM links 24, paragraph 0030) and populating the entries in the table

with a contention-free algorithm to provide exclusive reservation of timeslots in the frame for

cells of TDM traffic (the number of time slots per cycle per circuit are reserved for circuit switched packets according to a time slot allocation and path selection algorithm carried out by the network controller 30 must be contention free in order to meet the required throughput specified in a circuit request, paragraphs 0030-0031 and 0045-0048).

Regarding claim 5, Personick also teaches maintaining the table (a database) with a central management (the network controller 30, Fig. 1 implemented as a centralized network management system) that manages tables (multiple tables must be included since the database contains time slots allocation for all TDM links 24 within network 10) of multiple switch interface devices (the transitional switches 26 and core switches 28) in a system (Fig. 1). See paragraphs 0030, 0032, 0038.

Regarding claim 6, Personick further teaches transmitting cells of TDM traffic (circuit switched packets) from multiple discrete switch interface devices (input transitional switches 26, Fig. 1), each according to a populated table (a database), to avoid arbitration of the TDM traffic via a central scheduler (the scheduler 48, Fig. 3) at a core of the switch fabric (a core switch 28). See paragraphs 0038-0039, 0048-0049.

Regarding claim 7, Personick also teaches providing a synchronization signal to demark the frame (since the cycle (i.e., frame) and slot timing on links 24 are synchronized by a synchronization system, paragraph 0042, a synchronization signal to demark the frame must be provided).

Regarding claim 8, Personick also teaches providing distributed switching of TDM traffic from multiple sources of TDM traffic over the fabric (core switch 28 is connected to multiple sources of circuit switched traffic via input transitional switches 26 in Fig. 1, paragraphs 0024-0025).

Regarding claim 9, as shown in Fig. 5, Personick teaches:

Preventing PDU traffic (packet switched packets) from being transmitted on a timeslot that is reserved for TDM traffic (circuit switched packets) (step 122, core switch 28 prevents packet switched packets from being transmitted in time slots reserved for and contain circuit switched packets, paragraph 0051 and claim 6).

Determining whether an egress device has bandwidth that is not reserved for TDM traffic by TDM timeslot reservations (step 122, core switch 28 must determine whether the selected outgoing link 24 connected to an output switch 26b has empty time slot for transmitting packet switched packet(s) to an output switch 26b before transmitting in step 124, paragraph 0051 and claim 6).

Transmitting PDU traffic to the egress device if the egress device has available bandwidth that does not contend with the TDM traffic reservations as a result of the determination (step 124, core switch 28 transmits packet switched packet(s) in a time slot(s) which has not been reserved for circuit switched data on the selected outgoing link 24, paragraph 0051 and claim 6).

Regarding claim 10, as shown in Fig. 1, Personick teaches a switching system (network 10) comprising:

A packet-switched fabric (core switch 28) that switches TDM traffic and packet-based traffic (core switch 28 for switching packet switched data comprising circuit switched packets and packet switched packets is maintained in network 10 as shown in Fig. 1, Abstract, paragraphs 0025, 0033-0036, 0038-0039).

Multiple switch interfaces (transitional switches 26) having a table of entries, each entry corresponding with a timeslot on a frame (a cycle), the frame to allocate timeslots for switching the TDM traffic and the packet-based traffic, the multiple switch interfaces to transmit cells of traffic in accordance with the entries in the table (implemented as a combination of centralized and distributed management systems, a database of network controller 30 for allocating time slots reserved for each of the circuit switched circuits on each TDM links, and enabling empty time slot(s) to be used for transmitting packet switched packets is located at each transitional switch 26, paragraphs 0030-0032, 0037-0039, 0047-0049, and 0051).

A switch management circuit to define the frame and synchronize switching of traffic over the fabric to switching both the TDM traffic and the packet-based traffic in accordance with the frame (network controller 30 and synchronization system 32 constitute a switch management circuit, paragraphs 0030-0032, 0042, 0047-0048, 0051).

Claims 11, 12, 14, and 16 contain similar limitations as disclosed in claims 2, 3, 7, and 9, respectively, and are therefore rejected under the same reason set forth in the rejection of claims 2, 3, 7, and 9, respectively.

Regarding claim 13, it is inherent that when implemented as a combination of centralized and distributed management systems, a database of network controller 30 located at each transitional switch 26 must receive modifications of the database from the centralized network controller 30 in order for the whole network to have the same version of the database containing TDM time slot allocation (paragraphs 0030 and 0032).

Regarding claim 15, Personick also teaches that the multiple switch interfaces (transitional switches 26) are directly inter-connectable for system input to system output via the timeslots on the frame synchronized by the switched management circuit (network controller 30 and synchronization system 32 constitute a switch management circuit). See paragraphs 0024, 0030-0032, and 0042.

Regarding claim 17, Personick also teaches that the switch fabric (core switch 28, Fig. 3) comprises multiple discrete switching circuits (a packet router 46 and a time divided-space switch 45, paragraphs 0033-0034 and 0036).

Regarding claim 18, it is inherent that the multiple switch interfaces (input transitional switches 26, Figs. 1, 4A, and 4B) must comprise multiple ingress/egress linecards for receiving the traffic and transmitting the traffic to/from the network 10 (paragraphs 0024, 0040-0041).

Regarding claim 19, Personick teaches that the switch management circuit comprises a switch management linecard (synchronization system 32) having a circuit to generate a

synchronization signal and a circuit to provide management of the table (network controller 30).

See paragraphs 0030-0032, 0042, 0047-0048, 0051.

Claim Rejections - 35 USC § 103

8.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9.   Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over an art of record,

Personick (US 2002/0191588 A1) in view of McCrosky (US 6,876,650 B2).

Regarding claim 4, Personick does not explicitly teach providing a contention-free

allocation in time and space of TDM traffic using a Slepian-Duguid-based algorithm as claimed.

However, McCrosky teaches using a Slepian-Duguid-based algorithm in time and space

switching fabric for TDM switching of signals (col. 1, lines 11-40).

Given the teaching of McCrosky, it would have been obvious to one skilled in the art at

the time the invention was made to further modify the teaching of Personick such that a

contention-free allocation in time and space of TDM traffic using a heuristic scheduling

algorithm would be provided as claimed. The suggestion/motivation to do so would have been

to schedule connections in rearrangeably non-blocking switches that always succeeds on loads of

up to 100% capacity as suggested by McCrosky (col. 1, lines 26-28 and 39-40).

Response to Arguments

10.   Applicant's arguments filed 10/12/2007 have been fully considered but they are not

persuasive.

A.   In the remarks on page 9, the applicants argue that Personick fails to teach the frame that

allocates timeslots for switching the TDM traffic and the packet-based traffic as amended, but

admit that Personick teaches integrating circuit switching and packet switching fabrics into the

same network.

        In response, Personick teaches a frame comprising a number of time slots as show in Fig.

2 for transporting TDM traffic (circuit switched packets) and the packet-based traffic (packet

switched packets) between switching nodes. Steps 112-116 and 122-124 of Fig. 5 of Personick

show that the time slots are used for switching the TDM traffic (circuit switched packets) and the

packet-based traffic (packet switched packets). See Abstract and paragraphs 0025, 0031, 0048-

0049, and 0051. Therefore, claim limitation of the frame that allocates timeslots for switching

the TDM traffic and the packet-based traffic is clearly met.

Conclusion

11.   Applicant's amendment necessitated the new ground(s) of rejection presented in this

Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

        A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this

final action.

12.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Nittaya Juntima whose telephone number is 571-272-3120. The

examiner can normally be reached on Monday through Friday, 8:00 A.M - 5:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Huy Vu can be reached on 571-272-3155. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would

like assistance from a USPTO Customer Service Representative or access to the automated

information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Nittaya Juntima
1/31/2008
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